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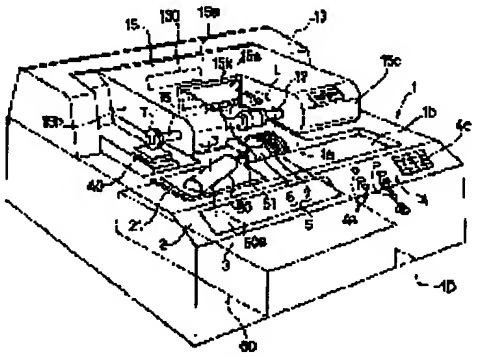
(71)Applicant : TOPCON CORP
(72)Inventor : SUZUKI YASUO

(54) BORING DEVICE FOR RIMLESS LENS, LENS LAPPING MACHINE USING THE SAME AND SHAPE MEASURING DEVICE FOR GLASSED USED THEREIN

(57)Abstract:
PURPOSE: To accurately bore a lens fasening hole in the direction crossing a refractive surface at a right angle.
CONSTITUTION: In a lens lapping machine equipped with a lens grinding rubstone 5 and a carriage 15 holding a rimless lens L in a manner rotatable around a lens rotary shaft, a hole position input device inputting the position of the lens fastening hole bored in the rimless lens L, a movable boring device 50 changed in its cutting direction and cutting the rimless lens L to bore the lens fastening hole, an angle-of-inclination measuring device measuring the angle of inclination of the refractive surface of the rimless lens at the position of the lens fastening hole and a control device controlling the position and direction of the boring device 50 on the basis of the position of the lens fastening hole and the angle of inclination measured by the angle-of-inclination measuring device to bore the lens fastening hole at the aforementioned position in the direction crossing the refractive surface of the rimless lens L are provided.



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CLAIMS

[Claim(s)]
[Claim 1] Perforation equipment for rim loess lenses characterized by having a lens maintenance means to hold the rim loess lens after a grinding process, a perforation means to make lens **** in the predetermined position of the periphery section of the rim loess lens held at this lens maintenance means, and an angle adjustment means to adjust the angle of the perforation direction by the aforementioned perforation means.
[Claim 2] The cutter for lens processing which is characterized by providing the following and by which high-speed rotation is carried out in a predetermined position, and the lens edger which held the rim loess lens possible [rotation] to the circumference of the lens axis of rotation, and it has with the carriage which can move relatively the wheel base of the lens axis of rotation and the aforementioned cutter for lens processing possible [change]. A hole position input means to input the hole position of lens **** which can be opened in the aforementioned rim loess lens. A perforation means to be able to move, and for the sense of the cutting direction to be changed, to cut the aforementioned rim loess lens, and to make the aforementioned lens ****. A tilt-angle measurement means to measure the tilt angle of the predetermined refracting interface of the rim loess lens in the aforementioned lens **********. the hole position of lens **** inputted by the aforementioned hole position input means, and the tilt angle measured by the aforementioned tilt-angle measurement means — being based — the position and the sense of the aforementioned perforation means — controlling — the hole position of the aforementioned rim loess lens — and the perforation control means which make lens **** made in the direction which intersects perpendicularly with the refracting interface in the hole position
[Claim 3] A lens maintenance means to hold the lens for a demonstration. A configuration measurement means to measure the configuration of the lens for a demonstration held at this lens maintenance means. It is the configuration measuring device for glasses used for the lens edger of the claim 2 equipped with the above, and when the rim loess lens for a demonstration is made to hold for the aforementioned lens maintenance means, it is characterized by establishing a position detection means to detect lens ********** which was able to be opened in this rim loess lens for a demonstration.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the configuration measuring device for glasses used for the perforation equipment for rim loess lenses which makes lens **** in a rim loess lens, the lens edger using this, and this lens edger.
[0002]
[Description of the Prior Art] Lens **** which can be conventionally made in a rim loess lens piled up the rim loess lens by which the grinding process was carried out to the template with which lens **** was prepared, attached **** to the position of the refracting interface of the rim loess lens corresponding to the lens ****, cut after this the position which the skilled spectacles engineer inscribed on the rim loess lens with the drill, and has opened it in the direction which intersects perpendicularly with a refracting interface.
[0003]
[Problem(s) to be Solved by the Invention] However, it was difficult for the refracting interface which is a front face of a rim loess lens to discern correctly the direction which intersects perpendicularly with the refracting interface, since it is curving, it depended on intuition and lens **** was made in the rectangular direction.
[0004] For this reason, although lens **** opens in many cases in the direction of slant to a refracting interface, the ginglymus which connects the lens fastening plate attached in lens ****, this lens fastening plate, and ear credit (temple) in such a case is adjusted and it is made for a rim loess lens not to separate from a lens fastening plate, there was a flower-stalk problem that the tuning was very troublesome.
[0005] This invention was made in view of the above-mentioned trouble, and the purpose is in offering the lens edger which can make lens **** in the direction which intersects perpendicularly with a refracting interface correctly, and the configuration measuring device for glasses used for this lens edger.
[0006]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, in invention of a claim 1, it is characterized by having a lens maintenance means to hold the rim loess lens after a grinding process, a perforation means to make lens **** in the predetermined position of the periphery section of the rim loess lens held at this lens maintenance means, and an angle adjustment means to adjust the angle of the perforation direction by the aforementioned perforation means.
[0007] The cutter for lens processing by which high-speed rotation is carried out in invention of a claim 2 in a predetermined position, In the lens edger which held the rim loess lens possible [rotation] to the circumference of the lens axis of rotation, and it has with the carriage which can move relatively the wheel base of the lens axis of rotation and the aforementioned cutter for lens processing possible [change] A hole position input means to input the hole position of lens **** which can be opened in the aforementioned rim loess lens, A perforation means to be able to move, and for the sense of the cutting direction to be changed, to cut the aforementioned rim loess lens, and to make the aforementioned lens ****, A tilt-angle measurement means to

measure the tilt angle of the predetermined refracting interface of the rim loess lens in the aforementioned lens **********, Based on the hole position of lens **** inputted by the aforementioned hole position input means, and the tilt angle measured by the aforementioned tilt-angle measurement means, the position and sense of the aforementioned perforation means are controlled. the hole position of the aforementioned rim loess lens — and it is characterized by preparing the perforation control means which make lens **** made in the direction which intersects perpendicularly with the refracting interface in the hole position

[0008] When the rim loess lens for a demonstration makes hold for the aforementioned lens maintenance means, in the configuration measuring device for glasses equipped with a lens maintenance means hold the lens for a demonstration, and a configuration measurement means measure the configuration of the lens for a demonstration held at this lens maintenance means, in invention of a claim 3, it carries out having established a position detection means detect lens ********** which was able to open in this rim loess lens for a demonstration as the feature.

[0009]

[Function] In case lens **** is made in the predetermined position of the periphery section of the rim loess lens which is made to hold the rim loess lens after a grinding process by the lens maintenance means, and is held by the perforation means at the aforementioned lens maintenance means according to invention of a claim 1, an angle adjustment means adjusts the angle of the perforation direction by the aforementioned perforation means.

[0010] According to invention of a claim 2, the hole position of lens **** opened in a rim loess lens by the hole position input means is inputted. The hole position of lens **** where the tilt-angle measurement means measured the tilt angle of the predetermined refracting interface of the rim loess lens in the hole position of the aforementioned lens ****, and cutting control means were inputted by the aforementioned hole position input means, the tilt angle measured by the aforementioned tilt-angle measurement means — being based — the position and sense of a perforation means — controlling — the hole position of the aforementioned rim loess lens -- and lens **** is made to be made in the direction which intersects perpendicularly with the predetermined refracting interface in the hole position

[0011] According to invention of a claim 3, when the rim loess lens for a demonstration is made to hold for a lens maintenance means, a position detection means detects lens ********** which was able to be opened in the rim loess lens for the demonstration.

[0012]

[Example] Hereafter, the example of this invention is explained based on a drawing.

[0013] In drawing 1 , the inclined plane where 1 was prepared in the main part of the shape of a housing of a lens edger, and 2 was prepared in the anterior upper part of a main part 1, the liquid crystal display section by which 3 was prepared in the left-hand side half of an inclined plane 2, the keyboard section by which 4 was prepared in the right-hand side of an inclined plane 2, 4a-4c, etc. are the switches formed in the keyboard section 4.

[0014] Moreover, Crevices 1a and 1b are established in the portion the center of a main part 1, and near the left-hand side section, and the grinding stone (cutter for lens processing) 5 held free [rotation on a main part 1] is arranged in crevice 1a. The rotation drive of this grinding stone 5 is carried out without having and illustrating the rough grinding stone 6 and the V groove grinding stone 7.

[0015] The tie-down plate section which is not illustrated is prepared in the main part 1, as shown in drawing 2 , the brackets 10 and 11 for axial attachment protrude on the both-sides section of this tie-down plate section, and the axial support salient 12 protrudes on the pars intermedia of the tie-down plate section. The both ends of the support shaft 14 which penetrates the axial support salient 12 are being fixed to these brackets 10 and 11.

[0016] Carriage 15 is arranged on the main part 1 of <carriage>. This carriage 15 has the salients 15d and 15e which were prepared in the both sides of main part of carriage 15a, and this main part of carriage 15a towards the front at one and which protruded on the parallel arm sections 15b and 15c and the both sides of main part of carriage 15a towards back mutually, as shown in drawing 2 .

[0017] These salients 15d and 15e are held at the support shaft 14 free [movement to the

longitudinal direction (right and left) of the support shaft 14] possible [the rotation to the circumference of the axis of the support shaft 14] while they are arranged in the position which sandwiches the axial support salient 12. It has come to be able to carry out the vertical rotation of the front end section of carriage 15 centering on the support shaft 14 thereby.
[0018] The lens axis of rotation 16 is held free [rotation] at arm section 15b of this carriage 15, the lens axis of rotation 16 and the lens axis of rotation 17 arranged on the same axle are held possible [attitude adjustment] to the lens axis of rotation 16 at arm section 15c of carriage 15 free [rotation], and the processed lens L is pinched between the opposite edges of these lens axes of rotation 16 and 17 (between the end sections). Moreover, Disk T is attached in the other end of the lens axis of rotation 16 removable by the fixed means which omitted illustration. The structure of this fixed means uses the well-known thing.
[0019] A rotation drive is carried out by the stepping motor 137 (refer to drawing 25) prepared in carriage 15, and this lens axis of rotation 17 also rotates the lens axis of rotation 16 with the lens axis of rotation 17 by it.
[0020] The posterior part of the support arm 26 arranged in crevice 1a of a main part 1 is held free [horizontal movement] at the support shaft 14. This support arm 26 is held possible [to a longitudinal direction / in one / movement] free [relative rotation] to carriage 15. In addition, the pars intermedia of the support arm 26 is held free [horizontal movement] with the shaft which is not illustrated on a main part 1.
[0021] Between this support arm 26 and bracket 10, the spring 27 wound around the support shaft 14 is infixed, and the spring 28 is infixed between the main part 1 and the bracket 11. And carriage 15 stops in the position where the spring force of springs 27 and 28 balances, and the lens axis of rotation 16 and the processed lens L held among 17 are located on the rough grinding stone 6 in this halt position.
[0022] The plinth 21 which can move up and down is formed in crevice 1b of the main part 1 of <perforation equipment>, and the perforation equipment 50 which makes lens **** LH of the rim loess lens L is formed in this plinth 21. The attitude of the drill 51 of perforation equipment 50 is attained, around perpendicular axis 50a, perforation equipment 50 is a rotatable and, moreover, it can move it also in the direction (cross direction) of arrow A to a plinth 21. A drill 51 rotates by the motor 52.
[0023] A stepping motor 1101 (refer to drawing 26) performs vertical movement of a plinth 21, and stepping motors 1102 and 1103 perform rotation of perforation equipment 50 and movement of the direction of A. And a stepping motor 1102 functions as an angle adjustment means to adjust the angle of the perforation direction.
[0024] In main part of <tilt-angle measuring device> carriage 15a, the tilt-angle measuring device (tilt-angle measurement means) 130 which measures the tilt angle of the refracting interface of a rim loess lens is built in.
[0025] The tilt-angle measuring device 130 has a stepping motor 132, the susceptor 131 which carries out approach estrangement by the drive of this stepping motor 132 at the rim loess lens L, the filler 133,134 which is arranged on a susceptor 131 and is made to contact the anterior refracting interface Lf and the posterior refracting interface Lb of the rim loess lens L, the encoder 135,136 with which it was equipped on the susceptor 131 possible [detection of the movement magnitude of a filler 133,134], an arithmetic unit 105, and memory 102 and m1 grade, as shown in
[0026] It marches out and a filler 133,134 measures, as the chain line of drawing 1 shows from opening 15K prepared in the front face of main part of carriage 15a. Opening 15K are usually closed by shutter 15S, shutter 15S carry out slide movement rightward (setting to drawing 1) at the time of measurement, and opening 15K open them.
[0027] Radius vector angle thetai from memory 102 is inputted into the stepping motor 137 which rotates the rim loess lens L. And a stepping motor 137 roll-control-rotates [the lens axes of rotation 16 and 17] the lens axes of rotation 16 and 17 and the rim loess lens L only for radius vector angle thetai based on this input.
[0028] On the other hand, radius vector length rhoi is inputted into a stepping motor 132 from memory 102. And a stepping motor 132 drives a susceptor 131 based on this input, and positions

a filler 133,134 at the position of radius vector length rhoi.
[0029] The amounts fZi and bZi of detection of an encoder 135,136 are inputted into an arithmetic unit 105. An arithmetic unit 105 calculates a tilt angle, thickness, etc. of the anterior refracting interface Lf of the rim loess lens L, and the posterior refracting interface Lb from radius vector angle thetai, radius vector length rhoi, and the amounts fZi and bZi of detection, and searches for the configuration of the rim loess lens L from these. Tilt-angle data and configuration data which were called for with the arithmetic unit 105 are memorized by memory m1.
[0030] <Configuration measuring device for glasses> In the main part 1 of a lens edger, the configuration measuring device 60 for glasses is built in again.
[0031] Drawing 20 shows the configuration measuring device 60 for glasses.
[0032] The frame supporting structure 100 to which this configuration measuring device 60 holds three portions, i.e., a frame, greatly, While supporting alternatively one side of the lens supporting structure (lens maintenance means) 900 which makes a lens hold, and the this frame supporting structure 100 or the lens supporting structure 900 It consists of means-for-supporting section 200A which manages a transfer into the measuring plane of this supporting structure, and movement within the measuring plane, and the measurement section 300 which carries out digital measurement of the lens frame of a glasses frame, or the configuration of a lens. In addition, since the thing of the same structure as what was indicated by JP,61-274859,A is used for the frame supporting structure 100, the same sign as the sign indicated by this official report is attached, and the detailed explanation is omitted.
[0033] Means-for-supporting section 200A has the housing 201 as a main part. A housing 201 has a foot 253,254 and this foot 253,254 is laid possible [sliding] on the rail 251,252 attached in the main part 1 of a lens edger.
[0034] Moreover, when a rail 255,256 is formed in door 1D of the main part 1 of a lens edger and door 1D is opened, it is constituted so that it may be located on the extension wire of a rail 251,252. An operator can make a housing 201 able to slide if needed by this composition, and it can pull out out of the housing of lens grinding attachment.
[0035] On the housing 201, a housing 201 has the guide rails 202a and 202b installed in lengthwise (X shaft orientations of measurement system of coordinates) in parallel, and is laid free [sliding of a stage 203] on this guide rail again. The female screw 204 is formed in the inferior surface of tongue of the move stage 203, and the delivery screw 205 for the X-axes is screwed in this female screw 204. This delivery screw 205 for the X-axes rotates by the X-axis motor 206 which consists of a stepping motor.
[0036] The guide shaft 208 is passed to Y shaft orientations of measurement system of coordinates, and parallel between both-sides flange 207a of the move stage 203, and 207b, and this guide shaft 208 is constituted so that it can rotate by the guide shaft motor 209 attached in flange 207a. The guide slot 210 of a line [shaft / guide / 208 / parallel / shaft and parallel / the / superficies] is formed. The hand 211,212 as an electrode-holder attaching part is supported by the guide shaft 208 possible [sliding]. Heights 213a and 214a are formed in the axial hole 213,214 of this hand 211,212, respectively, and these heights 213a and 214a were engaged in the guide slot 210 of the above-mentioned guide shaft 208, and have prevented surrounding rotation of the guide shaft 208 of a hand 211,212.
[0037] A hand 211 has two slant faces 215,216 at which it crosses mutually, and it has two slant faces 217,218 at which the another side hand 211 crosses mutually similarly. The ridgeline 220 which both the slant faces 217,218 of a hand 212 make is parallel to the ridgeline 219 which the slant face 215,216 of a hand 211 makes, and the angle which a slant face 217,218 makes, and the angle which a slant face 215,216 makes are constituted by that equality will be carried out and it will be so that it may be located in the same flat surface. And among both the hands 211,212, as shown in drawing 21 , it is built over the spring 230. Moreover, Notches 215a and 217a are formed in the slant face 215,217, respectively.
[0038] The arm 241 which has the contact ring 242 at th end is attached in the hand 212 free [rotation] focusing on the other end. This arm 241 is always contacted by the microswitch 244 with the spring 243. These contact ring 242, an arm 241, a spring 243, and a microswitch 244

constitute the right-and-left eye judging equipment 240 of a frame. And the sensors 245, such as a microswitch which detects the lens supporting structure 900, are attached in the hand 212.
[0039] Moreover, in a hand 212, the encoder 700 is attached, and this encoder 700 generates a pulse, whenever a hand 212 carries out predetermined distance movement along with a guide 208 at a longitudinal direction. This pulse is counted by the counter and the travel of a hand 212 is found by the number of counts of this count.
[0040] When a hand 212 moves to the method position of the leftmost with a motor 224 (initial valve position), a microswitch 701 detects this and resets a counter.
[0041] A pulley 222 is supported to revolve by the end of the posterior flange 221 of the move stage 203 free [rotation], and the Y-axis motor 224 which changes from the stepping motor which has a pulley 223 to the other end of the posterior flange 221 is attached. The ends of the mini thia belt 226 which made the spring 225 placed between pulleys 223,224 have fixed at the pin 227 implanted in the upper surface of a hand 211. On the other hand, the collar 228 is formed in the upper surface of a hand 212, and this collar 228 is constituted so that the side of the pin 229 implanted in the posterior flange 221 of the move stage 203 by movement of a hand 212 may be contacted.
[0042] The measurement section (configuration measurement means) 300 consists of the sensor arm section 302 supported to revolve by the upper surface of the sensor arm rotation motor 301 which consists of the stepping motor attached in the inferior surface of tongue of a housing 201, and a housing 201 free [rotation]. It is built over the belt 305 between the pulley 303 attached in the axis of rotation of a motor 301, and the axis of rotation 304 of the sensor arm section, and, thereby, rotation of a motor 301 is transmitted to the sensor arm section 302.
[0043] The sensor arm 302 has two rails 311,311 passed above the base 310, it is equipped with the slider 350 of the sensor head section 312 free [a slide] on this rail 311,311, and the magnetic scale reading head 313 is attached in the unilateral side of the slider 350 of this sensor head section 312. The magnetic scale 314 attached in the base 310 in parallel with a rail 311 by this magnetic scale reading head 313 is read, and it is constituted so that the movement magnitude of the sensor head section 312 may be detected. Moreover, to the side besides the slider 350 of the sensor head section 312, the end of the constant torque spring 316 of the spring equipment 315 which always pulls this head section 312 to an arm one end side (it sets to drawing 20 and is a left) has fixed. Spring energization of the slider 350 is always carried out by the energization force of this constant torque spring 316 to the spring equipment 315 side.
[0044] The magnetic scale reading head 313 and the magnetic scale 314 of the above-mentioned sensor head section 312 constitute the movement magnitude measurement means.
[0045] Drawing 23 shows the composition of this spring equipment 315. the inside of the casing 317 attached in the base 310 of the sensor arm section 302 — electromagnetism — a magnet 318 is formed and the slide shaft 319 is constituted possible [sliding of the direction of an axis] in the axial hole of a magnet 318 It has a collar 320,321, a spring 323 intervenes between a collar 320 and the wall of casing 317, and this slide shaft 319 is always moved to the left by the slide shaft 319 with the spring 323.
[0046] The clutch plate 324,325 was supported to revolve possible [rotation] by the edge of the slide shaft 319, and the end of the constant torque spring 316 has fixed to one clutch plate 324. Moreover, among both the clutch plates 324,325, the spring 326 in which the slide shaft 319 was fitted intervened, the interval of these clutch plates 324,325 was always extended, and contact to the constant torque spring 316 and a clutch plate 325 is barred. Furthermore, the washer 327 is attached in the edge of the slide shaft 319.
[0047] Drawing 22 shows the composition of the sensor head section 312, the axial hole 351 is formed in the perpendicular direction at the end section of the slider 350 supported by the rail 311, and the sensor shaft 352 is inserted in this axial hole 351. Between the sensor shaft 352 and an axial hole 351, the ball bearing 353 held at the sensor shaft 352 intervenes, and, thereby, rotation of the circumference of the vertical-axis line of the sensor shaft 352 and movement of the direction of a vertical-axis line are smoothed.
[0048] Moreover, the arm 355 is attached in the center of the sensor shaft 352, and the arris filler 356 of the shape of a bead made to contact the arris slot of a lens frame is supported to

revolve by the upper part of this arm 355 free [rotation] as a frame filler (frame measurement means). And the periphery point of the arris filler 356 is constituted so that it may be located on the center line of the perpendicular sensor shaft 352.
[0049] Moreover, erection fixation of the tubed shaft 360,361 of a couple is carried out at the other end of a slider 350, and the lens test-section material 362 is arranged on this tubed shaft 360,361.
[0050] This lens test-section material 362 has the filler 366 which protruded on the inferior surface of tongue of the base 363 and the base 363, and protruded in the attachment shaft 364,365 (refer to drawing 6 A) which fitted into the tubed shaft 360,361 free [attachment and detachment], and the center on the base 362. This filler 366 has lens filler 366a which has the contact surface of predetermined radius of curvature in an upper case, and lens filler 366b which has the contact surface of a plane in the lower berth. As shown in drawing 6 B and drawing 6 C, devotion of a filler 366 is attained.
[0051] Moreover, the area sensor (position detection means) 1001 for detecting the position of lens **** LDH established in the rim loess lens LD for a demonstration (refer to drawing 24) is formed in the housing 201. This area sensor 1001 consists of CCD, and is formed in the shape of [which was extended in the direction of X] a line. The bracket 1002 prolonged in the direction of X is formed in the upper part position which countered this area sensor 1001, and two or more Light Emitting Diode1003 is arranged by the bracket 1002 along the direction of X. In addition, the bracket 1002 is held with the support 1004.
[0052] Two or more of this Light Emitting Diode1003 irradiates the parallel flux of light towards an area sensor 1001, as shown in drawing 24 .
[0053] If the rim loess lens LD for a demonstration is arranged between Light Emitting Diode1003 and an area sensor 1001, as for the light income of an area sensor 1001, light income will decrease on the edge LT of the rim loess lens LD for a demonstration, and the outskirts of lens **** LDH. The position of lens **** LDH can be calculated from the light income of each photo detector of this to the area sensor 1001.
[0054] In addition, when there is little light income, you may carry out the paint of the circumference of lens **** LDH in paints etc. The colors of a paint are red, a sour orange, yellow, green, blue, black, gray, etc.
[0055] And the configuration measuring device 60 for glasses functions as a hole position input means to input lens **********.
[0056] The light income of each photo detector of the area sensor 1001 when the control unit 1100 shown in drawing 26 makes the rim loess lens LD for a demonstration hold in the level state, Ask for the size of the major axis of lens **** LDH, and a minor axis from the configuration of the rim loess lens LD for a demonstration measured in the measurement section 300, compute the degree alpha of tilt angle of the refracting interface of the rim loess lens LD for a demonstration, especially an anterior refracting interface, and it carries out based on this degree alpha of tilt angle. Rotate a hand 211,212 and slope regulation of the refracting interface of the rim loess lens LD for a demonstration is performed. It asks for the position of lens **** LDH when changing lens **** LDH into a perpendicular state mostly as a polar coordinate, and asks for the hole position P of the rim loess lens L corresponding to the position of this lens **** LDH for which it asked (refer to drawing 2). Furthermore, a control unit 1100 makes lens **** LD made in the direction which intersects perpendicularly with the tilt angle beta of the refracting interface Lf of the rim loess lens L corresponding to the above-mentioned hole position P.
[0057] Although the above-mentioned control by the control unit 1100 is the case where the tilt angle beta of the anterior refracting interface Lf of the rim loess lens L and the tilt angle alpha of the anterior refracting interface of the rim loess lens LD for a demonstration are in agreement not being in agreement — a case — a lens — **** — LDH — almost — perpendicular — a state — having carried out — the time — a lens — **** — LDH — a position — a polar coordinate — ****** — asking — this — having asked — a lens — **** — LDH — a position — having corresponded — a rim — loess — a lens — L — a hole — a position — P — ' — asking — further — tilt-angle difference delta=beta-alpha — asking . And it asks for the position

of lens **** LDH of the rim loess lens LD for a demonstration when only angle alpha+delta makes the rim loess lens LD for a demonstration incline to the level surface H. It asks for the hole position P of the rim loess lens L corresponding to this position, it asks for the angle which intersects perpendicularly with the degree beta of tilt angle of the refracting interface Lf in the hole position P, and this degree beta of tilt angle, and lens **** LH is made to be made in the direction which intersects perpendicularly with a tilt angle beta in the hole position P.
[0058] Moreover, although the configuration measuring device 60 for glasses is built in in the main part 1 of a lens edger, it is not limited to this but you may make it become independent of the main part 1 of a lens edger in the above-mentioned example. In this case, you may transmit the information on the rim loess lens LD for a demonstration, the configuration data of Template T, the hole position P of lens **** LDH of the rim loess lens LD for a demonstration, etc. to the main part 1 of a lens edger using communication devices, such as the telephone line.
[0059] The <lens supporting structure> lens supporting structure 900 has the housing-like main part 902 of a electrode holder with which the flange 901,901 was formed in the flank, as shown in drawing 5 , drawing 7 - drawing 11 .
[0060] Four holes 902A-902D are formed in the main part 902 of an electrode holder. Among Holes 902A and 902B, as shown in drawing 8 , drawing 12 , and drawing 13 , the adhesive disk attaching part 910 is formed. The cylinder part 911 for fixture fitting by which this adhesive disk attaching part 910 was formed in the main part 902 of a electrode holder at one, The stop presser foot stitch tongue 913,913 which was arranged in the notch 912,912 formed in this cylinder part 911 for fixture fitting, and the notch 912,912, and was formed in the main part 902 of an electrode holder at one, positioning prepared in the positioning base 914 of the main part 902 of an electrode holder, and one prepared near the upper part in the cylinder part 911 for fixture fitting, and this positioning base 914 — it has the protruding line 915 of business
[0061] Moreover, the lens holder 930 shown in the template holder 920 or the 10th view shown in drawing 14 is held alternatively at the adhesive disk attaching part 910. And a lens attaching part consists of an adhesive disk attaching part 910 and a lens holder 930.
[0062] The template holder 920 shown in drawing 14 has the annular stop slot 924 which approached the shank 921, the positioning slot 922 established in the end of a shank 921, the flange 923 prepared in the other end of a shank 921, and the flange 923, and was established in the pars intermedia of a shank 921. On the flange 923, while the female screw cylinder 925 of a shank 921 and the same axle is formed in one, the locator pin 926,926 arranged in the position which sandwiches this female screw cylinder 925 is formed at one. Moreover, the fixed screw 927 is screwed in the female screw cylinder 925.
[0063] the feed hole 928 which engages with the template T attached in this template holder 920 at the female screw cylinder 925 and a locator pin 926,926, and a pin — the hole 929,929 is formed and the feed hole 928 of Template T and a pin — Template T is fixed to the **** holder 920 with the fixed screw 927 by inserting a hole 929,929 in the female screw cylinder 925 and locator pin 926,926 of the template holder 920, and screwing the fixed screw 927 female screw cylinder 925
[0064] The lens holder 930 shown in drawing 15 has the annular stop slot K which approached the shank 931, the positioning slot 932 established in the end of a shank 931, the flange 933 prepared in the other end of a shank 931, and the flange 933, and was established in the pars intermedia of a shank 931.
[0065] And on a flange 933, the one eye lens L fixes through a pressure sensitive adhesive doudle coated tape 934.
[0066] Moreover, among the holes 902C and 902D of the main part 902 of an electrode holder, the attaching part 960 which holds adsorption attaching part 910a possible [the slide to a longitudinal direction] is formed. As for adsorption attaching part 910a, the lens holder 930 is attached like the above.
[0067] Near the adsorption attaching part 910a, as shown in drawing 9 , the holddown s ction 970 which presses down the lens laid in the lens holder 930 is formed. The holddown section 970 has presser-foot section 970a which has elasticity.
[0068] 980 shown in drawing 9 is the supporter of the shape of a pillar which the nosepiece Fh of

the rim loess frame F is made to contact, and positions the rim loess frame F. This supporter 980 serves as a minor diameter as it goes to the bottom.

[0069] As shown in drawing 11 , drawing 16 , and drawing 17 , the supporter 980 is attached in the base 981 on which it can slide along with the slit G1, and is energized in the direction of an arrow with the spring S1. You put in a supporter 980 between the nosepieces Fh of the rim loess frame F for a while from the edge Ga of a slit G1 from a front position (position on the right of the position of the supporter 980 shown in drawing 11), and make it located in the position which set up the center position of the rim loess frame F beforehand by moving a supporter 980 to the edge Ga of a slit G1 according to the energization force of a spring S1.

[0070] In addition, composition other than **** has adopted what was indicated by JP,61-274859,A.

[0071] Next, an operation of the shape-measurement equipment of the lens lens of such composition is explained.

[0072] (1) When measuring the configuration of the lens frame configuration measurement lens frame (lens frame) 501 of a glasses frame, make it hold between the sliders 156,156 of the frame supporting structure 100, the lens frame 501, for example, the lens frame, of the side which wants to measure the right and left in a glasses frame.

[0073] While pulling out a housing 201 from the inside of the housing of lens grinding attachment (not shown), making the hand 211,212 by the side of this housing 201 incline in the slanting upper part on the other hand and removing the lens test-section material 362 from a slider 350 like drawing 19 The spring force of a spring 230 is resisted, this hand 211,212 is opened, the frame supporting structure 100 by which the glasses frame was held is arranged between hands 211,212, and the frame supporting structure 100 is made to pinch between hands 211,212 by the spring force of a spring 230.

[0074] In this state, since it is not made to turn on a sensor 245, CPU (operation control circuit) which is not illustrated detects that it is not equipped with the lens supporting structure 900 between hands 211,212, but the frame supporting structure 100 is held.

[0075] Then, after rotating a hand 211,212 until it becomes level below while resisting the spring force of the constant torque spring 316 and moving a slider 350 to the central site of a rail 311, the arris filler 356 is made to contact arris slot 501a of the lens frame 501 like drawing 19 and drawing 21 by the spring force of the constant torque spring 316. The base 310 is made to turn by operating a motor 301 and rotating the axis of rotation 304 in this state. The magnetic scale reading head 313 detects the movement magnitude of the arris filler 356 at this time. Under the present circumstances, the rotation angle of the base 310 is made to correspond, arris filler 356 movement magnitude is recorded, and the configuration of the lens frame 501 is calculated by CPU etc., and is searched for. Circuitry, the operation method, etc. for such an operation adopt what was indicated by JP,61-274859,A.

[0076] (2) In measuring the configuration of configuration measurement one side of a template, and Template T, as Template T was mentioned above to the template holder 920, it is attached in it, and it fits the shank 931 of this template holder 920 into the fixture fitting cylinder part 911 of the adhesive disk attaching part 910. Under the present circumstances, if the positioning slot 922 of the template holder 920 is made to engage with the protruding line 914 in the fixture fitting cylinder part 911, the stop presser foot stitch tongue 913,913 can engage with the stop slot 924 of the template holder 920, and the lens holder 930 can be made to hold to the adhesive disk attaching part 910.

[0077] On the other hand, while pulling out a housing 201 from the inside of the main part 1 of a lens edger and making the hand 211,212 by the side of this housing 201 incline in the slanting upper part, the spring force of a spring 230 is resisted, the interval of this hand 211,212 is opened, the lens supporting structure 900 by which Template T was held between this hand 211,212 is arranged, and the lens supporting structure 900 is made to pinch between hands 211,212 by the spring force of a spring 230.

[0078] In this state, a sensor 245 is made to turn on with the main part 902 of an electrode holder of the lens supporting structure 900, and this ON signal is inputt d into CPU (operation control circuit) which is not illustrated. This CPU judges being equipped with the lens supporting

structure 900 between hands 211,212 from ON signal of a sensor 245.
[0079] Then, after rotating a hand 211,212 until it becomes level below while resisting the spring force of the constant torque spring 316 and moving a slider 350 to the central site of a rail 311, the lens filler 366 is made to contact the peripheral surface of Template T like drawing 5 and drawing 18 by the spring force of the constant torque spring 316. In this state, by rotating the axis of rotation 304 which operates a motor 301, the base 310 is made to turn and the magnetic scale reading head 313 detects the movement magnitude of the lens filler 366 at this time. Under the present circumstances, the rotation angle of the base 310 is made to correspond, the movement magnitude of the lens filler 366 is recorded, and the configuration of Template T is calculated by CPU etc. and searched for. What was indicated by JP,61-267732,A (Japanese Patent Application No. No. 287491 [60 to]) is used for circuitry, the operation method, etc. for such an operation.
[0080] When measuring the configuration of the lens of rim loess frame glasses, the same measurement as the template T which attached this lens holder 930 in the adhesive disk attaching part 910, and mentioned it above is made to perform using the lens holder 930 as shown in drawing 15 .
[0081] Next, the case where the rim loess lens L is processed is explained.
[0082] First, while making the rim loess lens L pinch between the lens axis of rotation 16 and 17 as shown in drawing 1 and drawing 2 , the rim loess lens LD for a demonstration is attached in the lens holder 930 of the main part 902 of an electrode holder of the lens supporting structure 900 as shown in drawing 10 . And a hand 211,212 is moved to a predetermined position, and as shown in drawing 24 , lens **** LDH is located on an area sensor 1001.
[0083] Under the present circumstances, since the configuration of lens **** LDH is projected on an ellipse by the inclination of a refracting interface LDf as shown in drawing 27 (A) when the rim loess lens LD for a demonstration is held at a level with a hand 211,212, it can ask for the tilt angle alpha of the refracting interface of the rim loess lens LD for a demonstration, especially the anterior refracting interface LDf by measuring the major axis R1 of the projection image LT of lens **** LDH, and a minor axis R2. In addition, the configuration of projection image LT' of lens **** LDH at the time of holding a refracting interface LDf horizontally is shown in drawing 27 (B).
[0084] That is, the diameter (major axis) R1 of lens **** LDH is projected on the level surface as a minor axis R2, when the refracting interface LDf inclines with the tilt angle alpha to the level surface, and the relation of drawing 27 (C) is realized. If this is shown using a trigonometric function, it will become R1 and the cos alpha=R 2, and it is alpha=cos. - 1 (R2/R1)
It becomes. The tilt angle alpha of the refracting interface LDf of the rim loess lens LD for a demonstration is computable from this formula.
[0085] The revolution rotation of the hand 211,212 is made to carry out in the vertical direction based on the tilt angle alpha for which it asked here, slope regulation is performed, the refracting interface LDf of the rim loess lens LD for a demonstration is kept almost level, and the sense of lens **** LDH is mostly changed into a perpendicular state. That is, as shown in drawing 24 , the angle alpha inclination of the rim loess lens LD for a demonstration is done to level H.
[0086] Since the tilt angle alpha of the refracting interface LDf of the rim loess lens LD for a demonstration is 5 degrees - about 15 degrees, with the rim loess lens LDH for a demonstration which has the refracting interface LDf with a tilt angle of 10 degrees, the rim loess lens LD for a demonstration is made to incline at 10 degrees by the hand 211,212, a refracting interface LDf is leveled mostly, and the sense of lens **** LDH is mostly changed into a perpendicular state, for example.
[0087] Next, while measuring the configuration of the rim loess lens LD for a demonstration like Template T, Light Emitting Diode1003 is made to emit light, and the position of lens **** LDH is calculated from the light income of each photo detector of an area sensor 1001. It asks for the position of lens **** LDH by the polar coordinate based on the configuration data of the rim loess lens LD for a demonstration.
[0088] On the other hand, by the main part 1 of a lens edger, the grinding process of the rim loess lens L is carried out by the grinding stone 5 based on the configuration data of the above-

mentioned template T. After this grinding process is completed, the tilt-angle measuring device 130 makes a filler 133,134 march out, as the chain line of drawing 1 shows from opening 15K of main part of carriage 15a, and searches for the configuration of the rim loess lens L in quest of a tilt angle, thickness, etc. of the anterior refracting interface Lf of the rim loess lens L, and the posterior refracting interface Lb.

[0089] When the tilt angle alpha of the refracting interface of the rim loess lens L, the tilt angle beta of the anterior refracting interface Lf and the refracting interface of the rim loess lens LD for a demonstration, especially an anterior refracting interface is in agreement, a control unit 1100 asks for the hole position P of the rim loess lens L corresponding to the position of lens **** LDH of the rim loess lens LD for a demonstration based on the configuration of the rim loess lens L for which the tilt-angle measuring device 130 asked. Moreover, a control unit 1100 carries out the sense of a drill 51 in the direction which intersects perpendicularly with the degree alpha of tilt angle so that it may ask for the angle which intersects perpendicularly with the degree beta of tilt angle of the refracting interface Lf in the hole position P (=alpha), and this degree beta of tilt angle (=alpha), stepping motors 1101-1103 may be controlled further and the point of the drill 51 of perforation equipment 50 may contact the hole position P of the rim loess lens L.

[0090] And a control unit 1100 makes the motor which is not illustrated drive, advances a drill 51, and makes lens **** LH made in the direction which cuts the position P of the rim loess lens L, and intersects perpendicularly with a refracting interface Lf while it makes the drill motor 52 drive and rotates a drill 51.

[0091] By the way, the tilt angle beta of the refracting interface Lf of the rim loess lens L and the tilt angle alpha of the anterior refracting interface of the rim loess lens LD for a demonstration are not in agreement in many cases. In such a case, it cannot ask for lens ********** P of the rim loess lens L correctly from the position of lens **** LDH which was able to be opened at right angles to the anterior refracting interface LDf of the rim loess lens LD for a demonstration.

[0092] Then, a control unit 1100 asks for the position of lens **** LDH of the rim loess lens LD for a demonstration like the above, and asks for the position P of the rim loess lens L from this position. This position P for which it asked is made into P', and it asks for the tilt angle beta of the refracting interface Lf of the rim loess lens L in this position P', and asks for tilt-angle difference delta=beta-alpha further. And in addition to the aforementioned slope regulation of the hand 211,212 holding the rim loess lens LD for a demonstration, only the aforementioned tilt-angle difference delta carries out revolution rotation of the hand 211,212, and tunes the inclination of the rim loess lens LD for a demonstration finely. That is, only angle alpha+delta makes the rim loess lens LD for a demonstration incline to the level surface H. Furthermore, a control unit 1100 asks for the position PD of lens **** LDH of the rim loess lens LD for a demonstration held by tilt-angle alpha+delta tuned finely (not shown). It asks for the position PD of this lens **** LDH by the polar coordinate based on the configuration data of the rim loess lens LD for a demonstration like the above.

[0093] Subsequently, a control unit 1100 asks for the hole position P of the rim loess lens L corresponding to the position PD of lens **** LDH by the polar coordinate based on the configuration of the rim loess lens L for which the tilt-angle measuring device 130 asked. Moreover, a control unit 100 carries out the sense of a drill 51 in the direction which intersects perpendicularly with a tilt angle beta so that it may ask for the angle which intersects perpendicularly with the degree beta of tilt angle of the refracting interface Lf in the hole position P, and this degree beta of tilt angle, stepping motors 1101-1103 may be controlled further and the point of the drill 51 of perforation equipment 50 may contact the hole position P of the rim loess lens L.

[0094] And a control unit 1100 makes the motor which is not illustrated drive, advances a drill 51, and makes l ns **** LH made in the direction which cuts the position P of the rim loess lens L, and intersects perpendicularly with a refracting interface Lf while it makes the drill motor 52 drive and rotates a drill 51.

[0095] Next, in order to measure the position of lens **** LDH' of another side, a hand 211,212

is moved like the above, and lens **** LDH' is located on an area sensor 1001, and is performed.

[0096] Although a lens on either side is set and hole site measurement is performed 4 times since there are lens **** LDH of the rim loess lens LD for a demonstration and two LDH', since the configuration of a lens on either side is a candidate for right and left, it may measure two, lens **** LDH of the rim loess lens LD for a demonstration for left, and LDH', for example, may reverse the data, and may be used as data for right.
[0097] By the way, the degree alpha of tilt angle of the refracting interface Lf of the rim loess lens [in / this hole position P / a control unit 1100 asks for the hole position P of the rim loess lens L corresponding to the position of lens **** LDH, and] L Since it asks for the angle which intersects perpendicularly with this degree alpha of tilt angle, stepping motors 1101-1103 are controlled and the sense of a drill 51 is carried out in the direction which intersects perpendicularly with the degree alpha of tilt angle, lens **** LH can be correctly made in the direction which intersects perpendicularly with a refracting interface Lf.
[0098] For this reason, the skilled glasses engineer can attain like before the increase in efficiency of anchoring of the lens fastening plate which depends on intuition, and it becomes unnecessary to make lens **** LH in the refracting interface Lf and the rectangular direction of the rim loess lens L, and is attached in lens **** LH.
[0099] Moreover, since the area sensor 1001 for asking for the position of lens **** LDH of the rim loess lens LD for a demonstration is formed in the housing 201 of the configuration measuring device 60 for glasses Since the configuration test section 300 is used in order not to form separately [the main part 1 of a lens edger] the equipment which asks for the position of lens **** LDH and to ask for the position of lens **** LDH moreover It can prevent that can ask for the position of lens **** LDH correctly as a polar coordinate, and equipment is enlarged.

[0100] Next, the case where the lens geometrical pitch and lens configuration of a rim loess frame are measured is explained.
[0101] First, the one eye lens L of the rim loess frame F is removed, and the one eye lens L is attached in the lens holder 930 attached in the adhesive disk attaching part 910. On the other hand, the rim loess frame F which removed the one eye lens is set as shown in drawing 16 and drawing 17 .
[0102] And as it equips with this electrode holder 901 between arms 211,212 and is shown in drawing 3 a and drawing 4 a, lens filler 366a is made to contact the peripheral edge of Lens L, and a lens configuration is measured like the above. This measurement data shows the width Ha of the one eye lens L.
[0103] Next, while raising an arm 211,212 and making the slanting upper part incline, it is made to move to an initial valve position, and a counter (not shown) is made to reset. And this arm 211,212 is moved rightward and it is made to stop by the mid gear. A mid gear is searched for from the number of counts of the aforementioned counter. On the other hand, a slider 350 moves to an initial valve position with the constant torque spring 316, and as shown in drawing 4 c, it is in the state where lens filler 366b and the peripheral edge of Lens L estranged (each size is set up so that it may be in this state beforehand).
[0104] You drop an arm 211,212 and make it located in a level state in this state. And an arm 211,212 is moved further rightward and distance until the edge of Lens L contacts lens filler 366b is measured by the aforementioned counter. Distance by the counted value of this counter is set to H1.
[0105] By the way, since the distance from the initial valve position of an arm 212 to the supporter material 980 is determined by the number of counts of a counter and the position of the axis of rotation 304 is being fixed, the distance H2 to the contact surface of lens filler 366b which is in an initial valve position from the supporter material 980 serves as known.
[0106] Therefore, it can ask for one half of the width Hb of the rim loess frame F. That is, it can be found in H1-H2=Hb. These data to the lens geometrical pitch FPD is found from the following formula.
[0107] FPD=2x (Hb-Ha/2)

Thus, while exchanging the rim loess frame F for Lens L and doing a set again to the lens supporting structure 900 like before since the lens geometrical pitch FPD of the rim loess frame F can be found if the one eye lens L and the rim loess frame F are set in the lens supporting structure 900, this supporting structure 900 is taken out from an arm 211,212, and it is not necessary to reequip an arm 211,212 again. For this reason, the wearing operation will become very easy.

[0108] Since the position of this lens **** LDH is known beforehand, you may make it input this position data with an input unit (not shown) in the above-mentioned example, although the position of lens **** LDH of the rim loess lens LD for a demonstration is calculated from the light income of each photo detector of an area sensor 1001.

[0109]

[Effect] According to invention of a claim 1, as explained above, lens **** can be correctly made in the direction which intersects perpendicularly with the refracting interface of a rim loess lens, the skilled glasses engineer can depend on intuition, it is not necessary to make lens **** in the refracting interface and the rectangular direction of a rim loess lens, and, for this reason, the increase in efficiency of anchoring of the lens fastening plate attached in lens **** can be attained like before.

[0110] According to invention of a claim 2, since a position detection means to detect lens ********** is prepared in the configuration measuring device for glasses, it is not necessary to form the equipment which asks for lens ********** separately from the main part of a lens edger, and moreover, in order to ask for lens **********, a glasses configuration measuring device can be used, and, for this reason, it can ask for the position of lens **** L correctly. Moreover, it can prevent that equipment is enlarged.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective diagram having shown the appearance of a lens edger.
[Drawing 2] It is the plan having shown the outline composition of carriage.
[Drawing 3] (a) is the important section perspective diagram of the shape-measurement equipment of the lens concerning this invention. (b) is a perspective diagram explaining the case where a rim loess frame is measured.
[Drawing 4] (a) is explanatory drawing having shown the state of having attached a lens and a rim loess frame in the lens supporting structure, and measuring a lens configuration. (b) is explanatory drawing having shown lens width. (c) is explanatory drawing having shown the state of having attached a lens and a rim loess frame in the lens supporting structure, and measuring frame width.
[Drawing 5] A is explanatory drawing showing the relation between the lens supporting structure in the case of measuring a template, and shape-measurement equipment. B is explanatory drawing showing the relation between the lens supporting structure in the case of measuring frame width, and shape-measurement equipment.
[Drawing 6] A is the fragmentary sectional view showing the attachment structure of a lens filler. B is the side elevation having shown the lens filler. C is the side elevation having shown devotion of a lens filler.
[Drawing 7] It is the perspective diagram of the lens supporting structure.
[Drawing 8] It is the plan of drawing 7 .
[Drawing 9] It is the perspective diagram having shown the state where the lens and the rim loess frame were attached in the lens supporting structure.
[Drawing 10] It is explanatory drawing seen from the background of the lens supporting structure shown in drawing 7 .
[Drawing 11] It is explanatory drawing of the supporter formed in the lens supporting structure of drawing 9 .
[Drawing 12] It is explanatory drawing showing the system between the adhesive disk attaching parts and lens holders which were shown in drawing 8 .
[Drawing 13] It is the perspective diagram of the adhesive disk attaching part shown in drawing 12 .
[Drawing 14] It is the decomposition perspective diagram showing the relation between a template and a template holder.
[Drawing 15] It is the decomposition perspective diagram showing the relation between a lens and a lens holder.
[Drawing 16] It is explanatory drawing having shown the state where the lens of a rim loess frame was attached in the lens holder.
[Drawing 17] It is the side elevation having shown the state where the lens of a rim loess frame was attached in the lens holder.
[Drawing 18] It is explanatory drawing showing the relation between a lens and a lens filler.
[Drawing 19] It is explanatory drawing showing the measurement state by the arris filler of a lens frame.

[Drawing 20] It is the perspective diagram of a metering device which has the composition mentioned above.
[Drawing 21] It is explanatory drawing showing the measurement state by the arris filler shown in drawing 20 .
[Drawing 22] It is expansion explanatory drawing of the portion of an arris filler shown in drawing 20 .
[Drawing 23] It is the expanded sectional view of the portion of the constant torque spring shown in drawing 20 .
[Drawing 24] It is explanatory drawing having shown the relation with the output of an area sensor and an area sensor.
[Drawing 25] It is explanatory drawing having shown the composition of the tilt-angle measuring device prepared in the lens edger of drawing 1 .
[Drawing 26] It is the block diagram having shown the composition of the control system prepared in the lens edger of drawing 1 .
[Drawing 27] (A) It is explanatory drawing having shown the projection image of lens **** when the refracting interface inclines.
(B) It is explanatory drawing having shown the projection image of lens **** at the time of holding a refracting interface horizontally.
(C) It is explanatory drawing having shown the relation between the major axis of a projection image, and a minor axis.
[Description of Notations]
5 Grinding Stone
15 Carriage
50 Perforation Equipment (Perforation Means)
100 Tilt-Angle Measuring Device (Tilt-Angle Measurement Means)
300 Measurement Section (Configuration Measurement Means)
900 Lens Supporting Structure (Lens Maintenance Means)
1001 Area Sensor (Position Detection Means)
1100 Control Unit (Cutting Control Means)

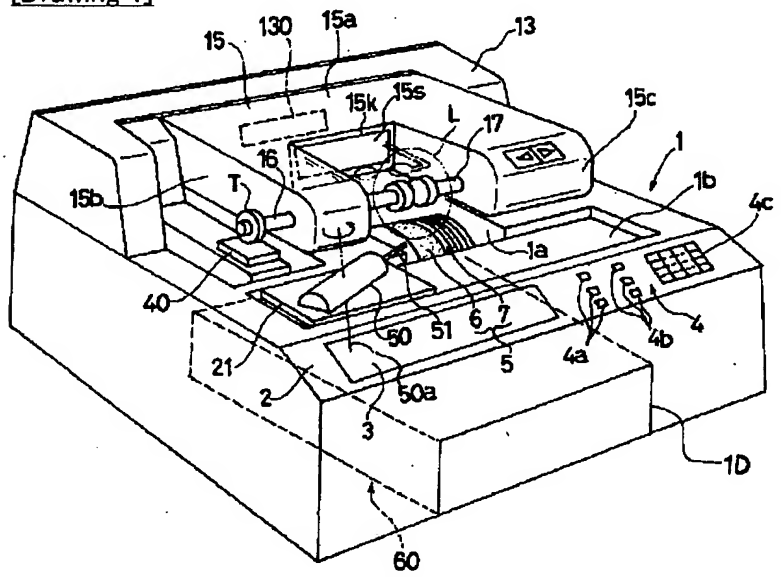
[Translation done.]

* NOTICES *

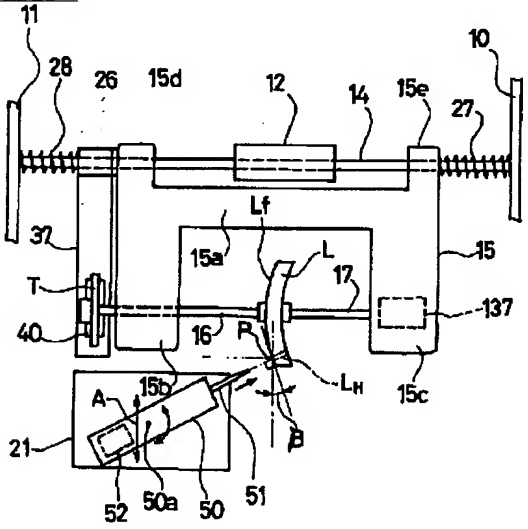
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]

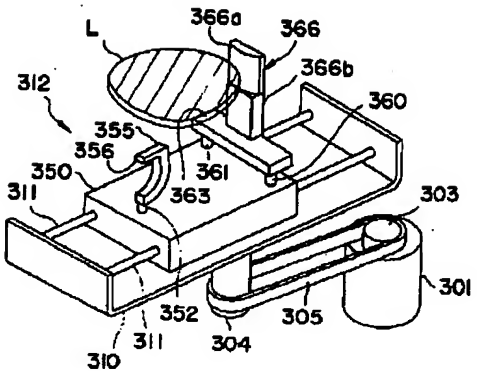


[Drawing 2]

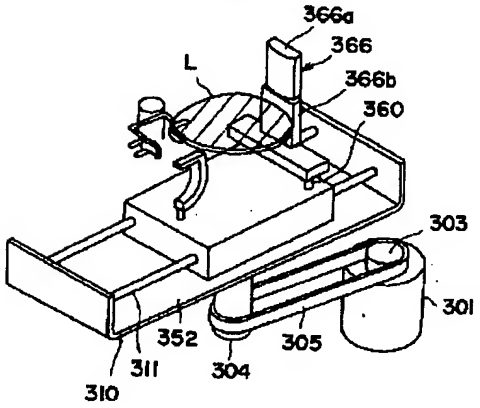


[Drawing 3]

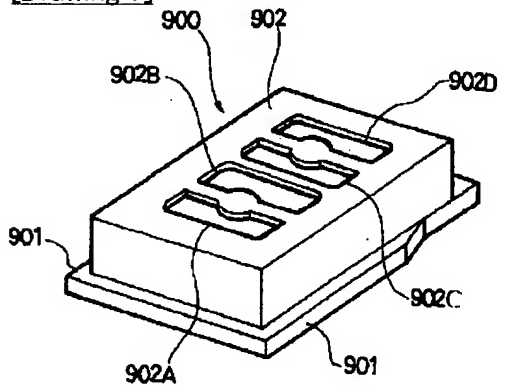
(a)



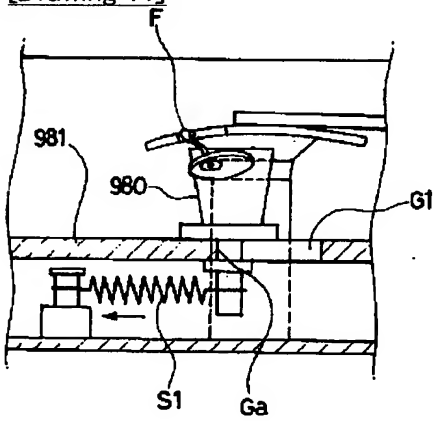
(b)



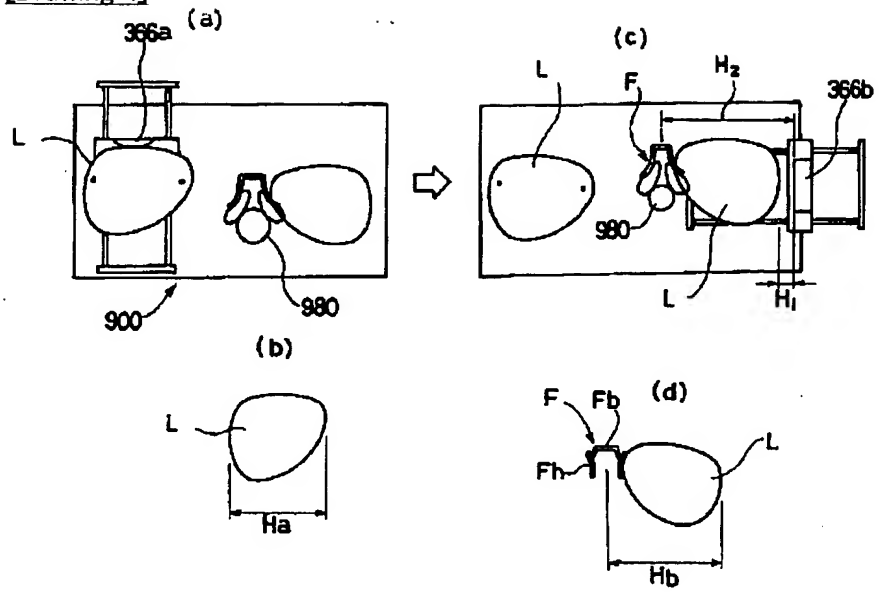
[Drawing 7]



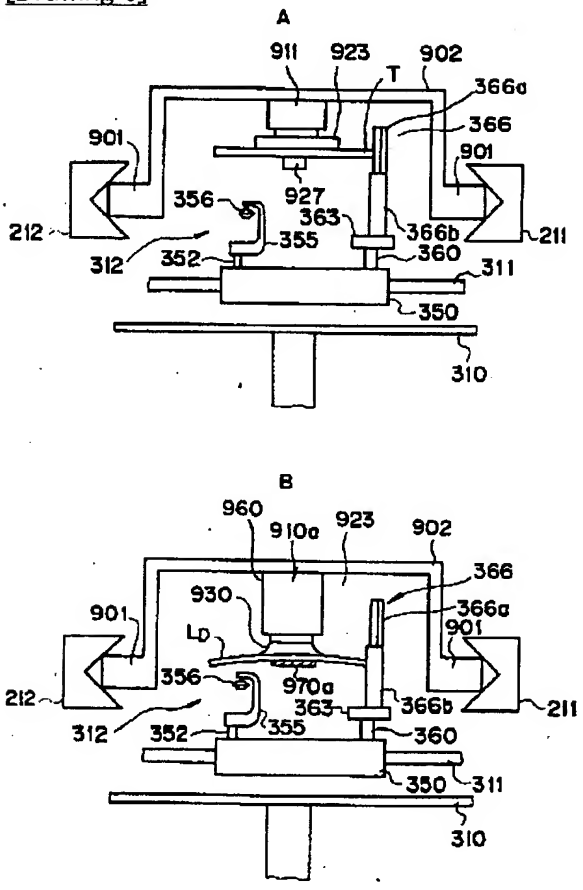
[Drawing 11]



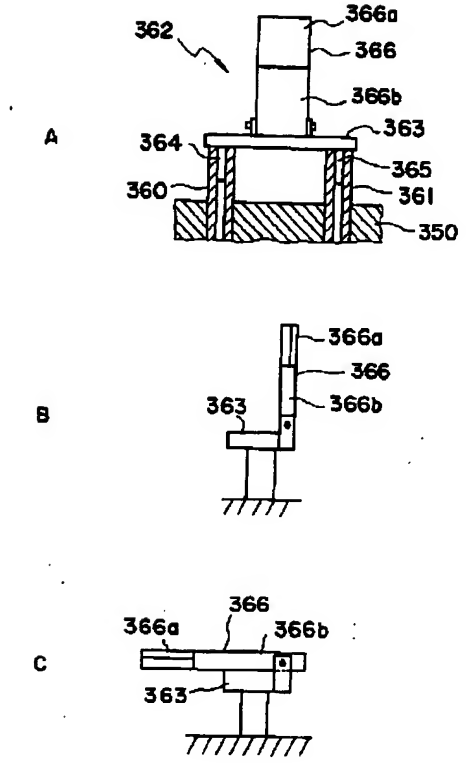
[Drawing 4]



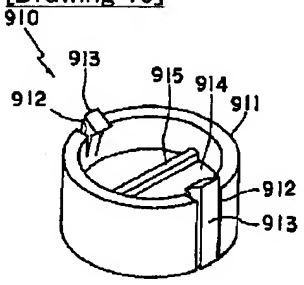
[Drawing 5]



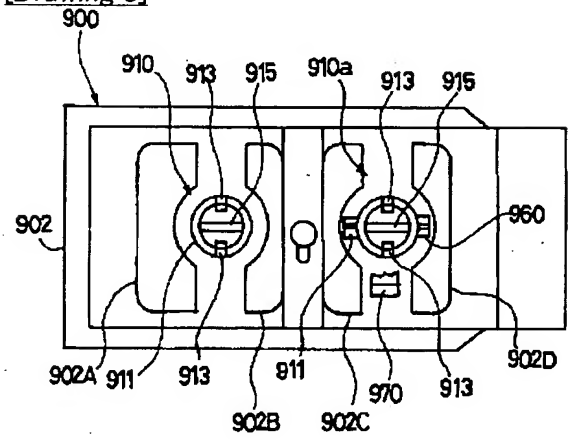
[Drawing 6]



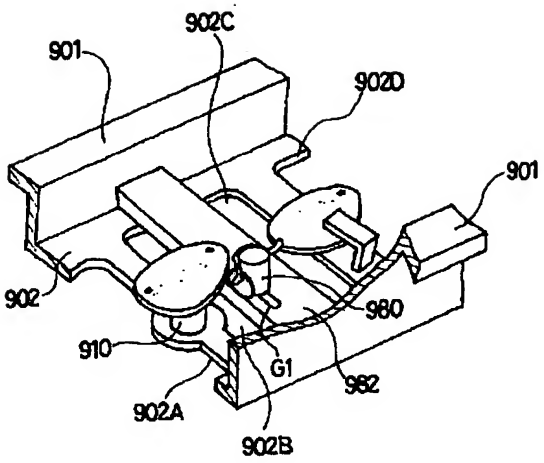
[Drawing 13]



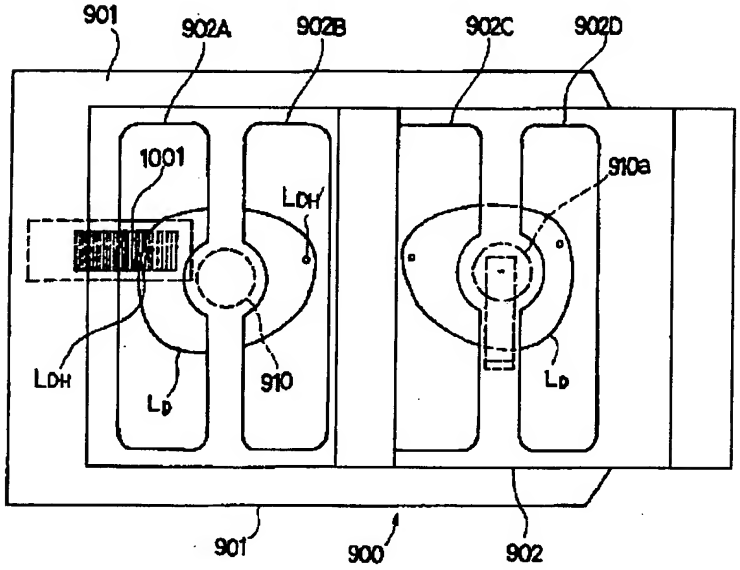
[Drawing 8]



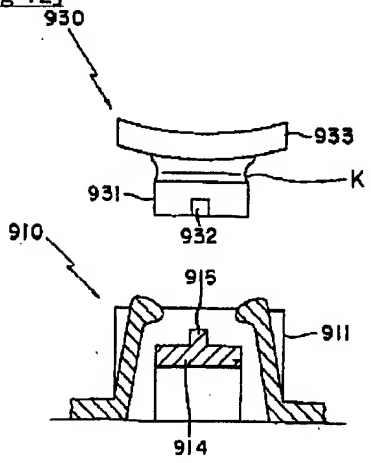
[Drawing 9]



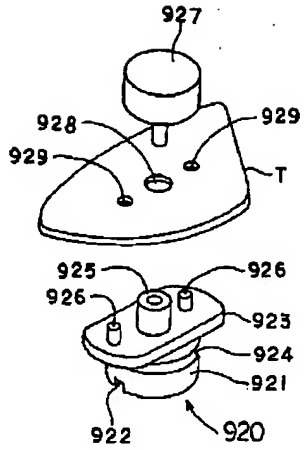
[Drawing 10]



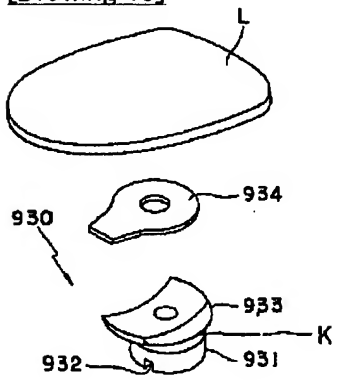
[Drawing 12]



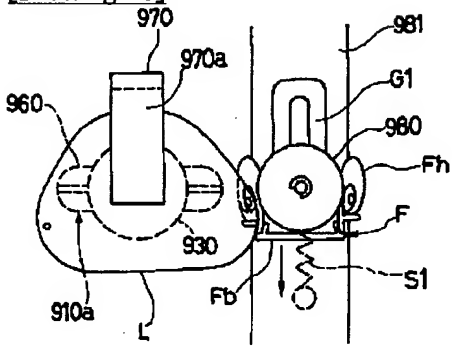
[Drawing 14]



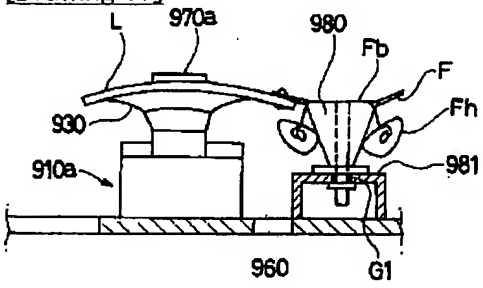
[Drawing 15]



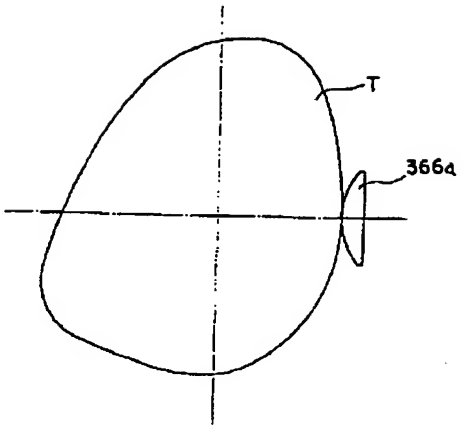
[Drawing 16]



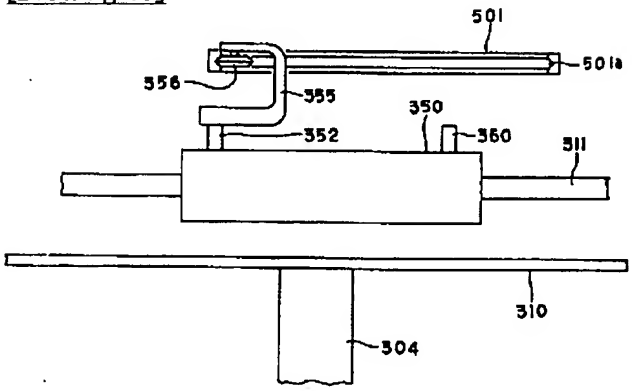
[Drawing 17]



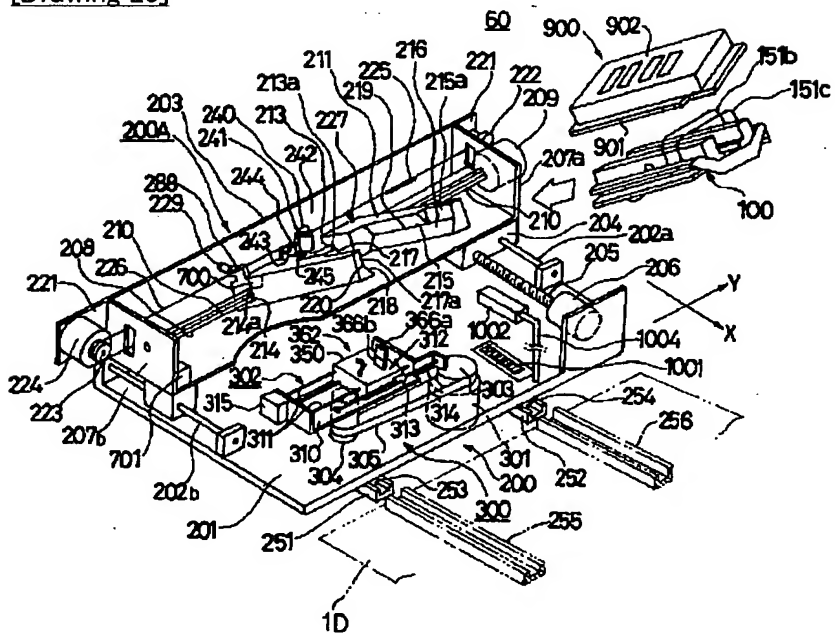
[Drawing 18]



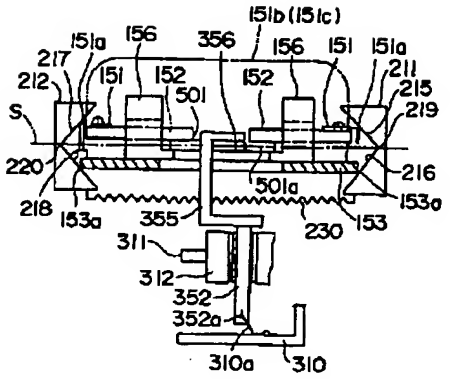
[Drawing 19]



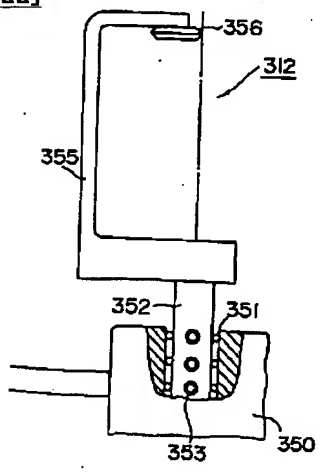
[Drawing 20]



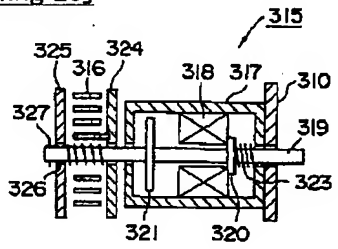
[Drawing 21]



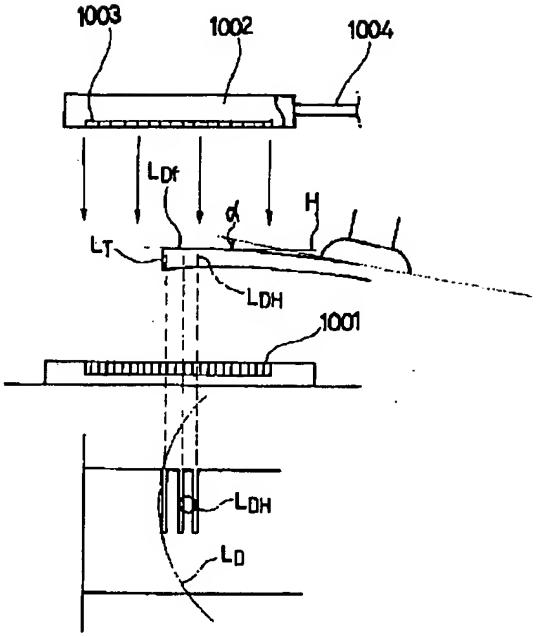
[Drawing 22]



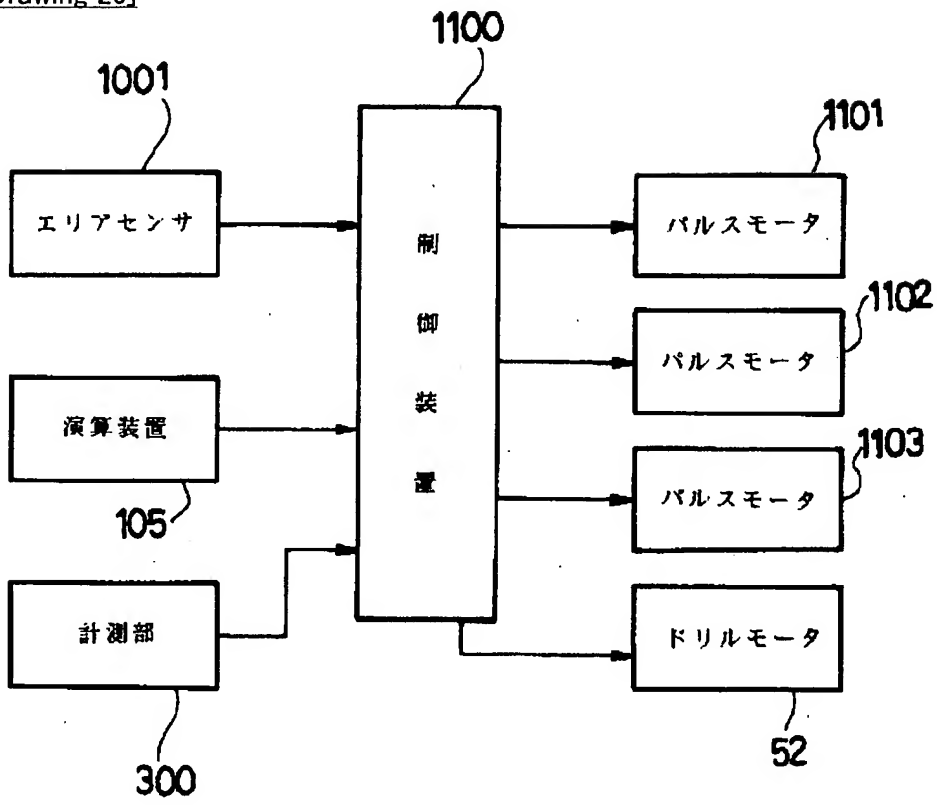
[Drawing 23]



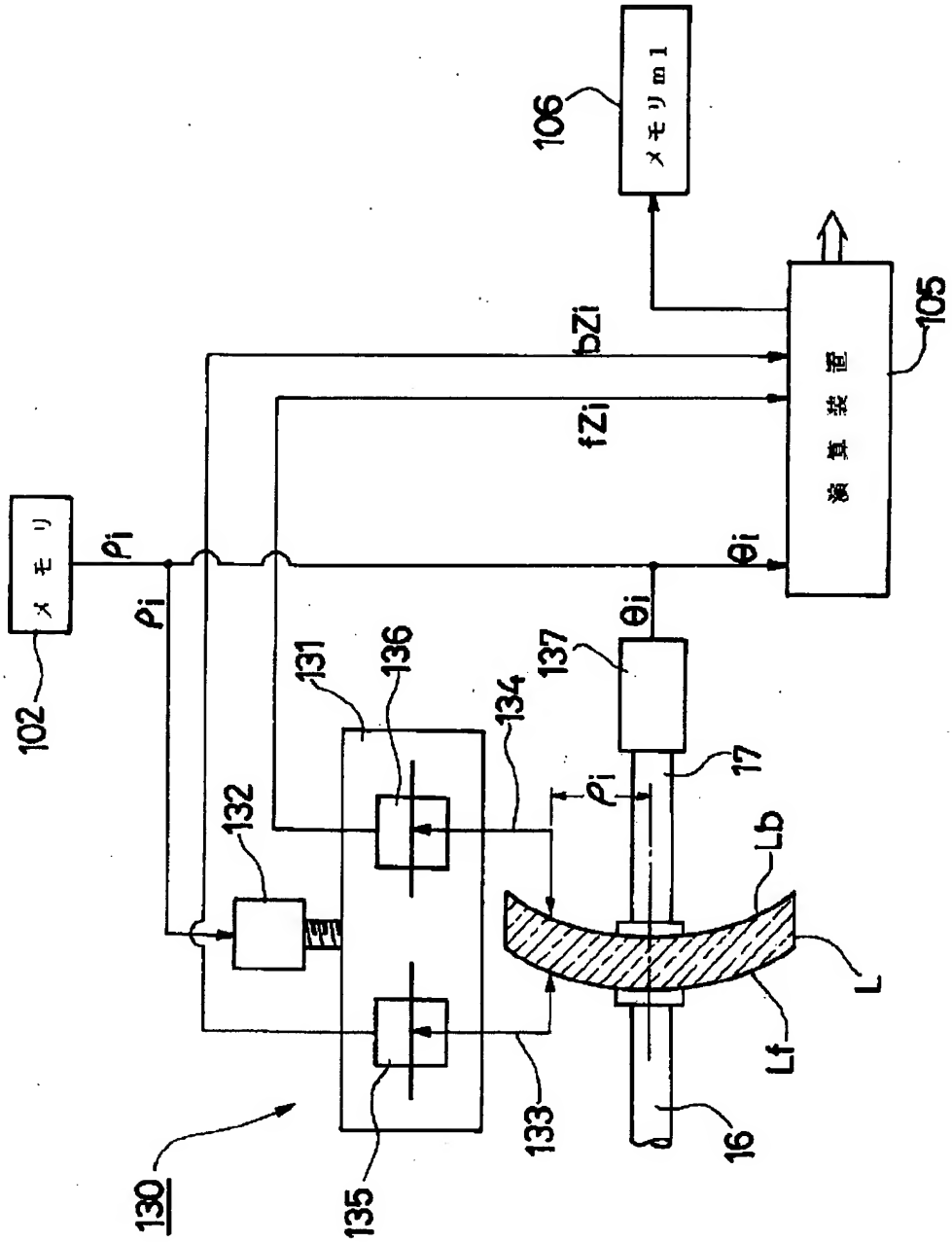
[Drawing 24]



[Drawing 26]

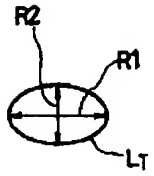


[Drawing 25]

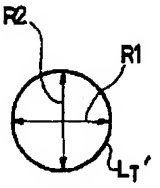

106
メモリm1
105
演算装置
bZi
fZi
θi
ρi
メモリ
102
131
136
134
137
17
132
Lb
L
Lf
133
16
135
130

[Drawing 27]

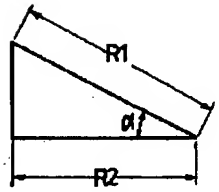
(A)



(B)



(C)



[Translation done.]